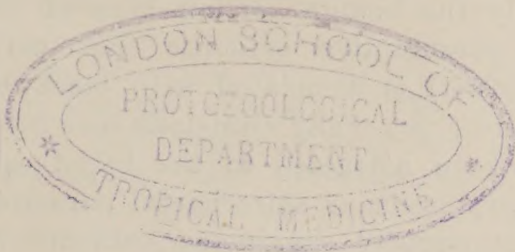


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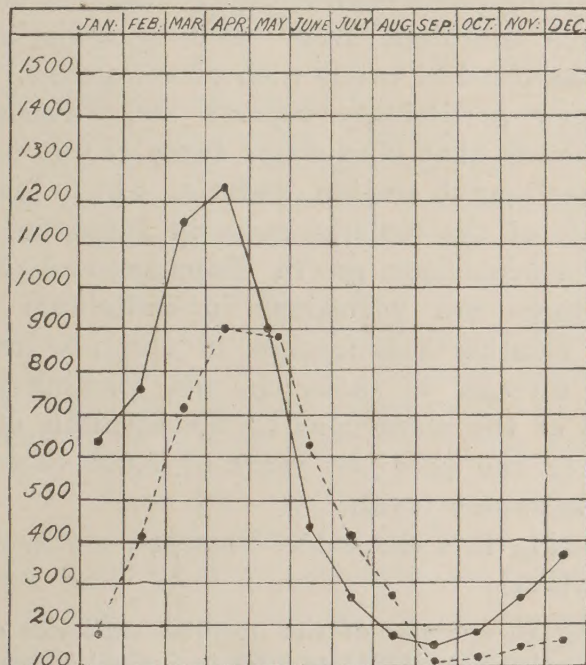


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BLACKWATER FEVER: ITS ETIOLOGY AND PARASITOLOGY.

IN our last issue we referred briefly to the recent research activities of the London School of Tropical Medicine. During the past two years Dr. J. Gordon Thomson, Director of the Department of Protozoology of the School,

MONTHLY INCIDENCE OF MALARIA AND BLACKWATER FEVER, SOUTHERN RHODESIA.



Hospital admissions 1913 to 1922 inclusive.

- Malarial curve.
- - - • - Blackwater fever curve (this curve is multiplied by 10).

Total malaria treated in hospitals, 6,608.

Total blackwater fever treated in hospitals, 492.

has been engaged upon an inquiry into the etiology of blackwater fever in Southern Rhodesia, and his preliminary report has just been issued.

In all parts of the world where pernicious malaria is rife blackwater fever is known, while it does not occur

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where there is only the benign tertian type of malaria. Although this is presumptive evidence that pernicious malaria (*P. falciparum*) is associated with blackwater or haemoglobinuric fever, yet many clinicians and not a few investigators have been attracted to the hypothesis that there is a special protozoan or spirochaetal parasite. The most recent and apparently convincing evidence in this direction was the work of Blanchard and Lefrou, who by a special technique claimed to have demonstrated a new spirochaete, named by them *Spirochaeta biliohaemoglobinuriae*. In an earlier communication* from South Africa Dr. J. G. Thomson conclusively showed by the study of a series of fifteen cases from the first day of illness to its termination that true spirochaetes did not occur, but that the Blanchard-Lefrou technique gave what he has termed "pseudo-spirochaetes"—that is, artefacts or filaments showing Brownian movement and resembling spirochaetes. These non-living pseudo-spirochaetes could also be recovered by the same technique from cases of malarial anaemia and from the blood of cattle with piroplasmiasis.

In his new preliminary report† Dr. Thomson frankly adopts the view that blackwater fever is due to infection with the malignant tertian malaria, which gives rise to 96 per cent. of the malaria cases in Rhodesia, and is of the same morphology as in Panama and Macedonia, although there are variations in individual infections. The close monthly relationship in the rise and fall of these two diseases is shown in the striking chart here reproduced of the admissions to the hospitals of Southern Rhodesia for the past ten years of 6,608 cases, and 492 cases of blackwater fever.

In discussing this chart Dr. Thomson makes the following observations:

By making an analysis of the hospital statistics of Southern Rhodesia for ten years (1913 to 1922 inclusive) I have been able to represent graphically the monthly relationship between malaria and haemoglobinuric fever. This chart shows clearly that as the incidence of malaria rises the cases of blackwater increase, and as the malaria falls we have a corresponding diminution of blackwater fever.

* The Common Occurrence of Pseudo-spirochaetes in the Blood of Blackwater Fever Cases and of Normal Human Beings and Animals when using the Technique of Blanchard and Lefrou. *Journal of Tropical Medicine and Hygiene*, August 1st, 1923.

† Preliminary Report on the Results of Investigations into the Causation of Blackwater Fever in Southern Rhodesia. By J. G. Thomson, M.B., Ch.B. Presented to the Legislative Council of Rhodesia, 1923. Salisbury: Printed by the Government Printer.

The cases of malaria commence with the first rains at the onset of summer in October, and steadily increase during November, December, January, February, and March, finally reaching a maximum in April. The first and last three months of every year supply the rainfall and ideal temperature required for the rapid multiplication of anopheline mosquitos. Observations and collections of anopheline mosquitos showed that these were most numerous during the month of April. . . .

It will be noted that the worst months for blackwater fever are April, May, and June, as it is during these months the full effects of malaria occur, and the sudden drop in the incidence of blackwater during the months of July, August, and September corresponds in a remarkable manner to the diminution of malaria and the disappearance of mosquitos.

Such a co-relationship as indicated by this chart over a period of ten years, which includes 6,608 cases of malaria and a total of 492 cases of blackwater fever, shows definitely that malaria and haemoglobinuric fever are either one and the same disease or that both diseases are conveyed by the same biting insect or by insects with similar seasonal and domestic habits.

The fact that blackwater fever occurs principally amongst persons who live in unprotected houses and are careless about mosquito nets gives us positive evidence that this condition is associated with the bites of mosquitos, and reference to the chart proves that it is undoubtedly associated with the period when anopheline mosquitos are most active. It is important to note that a temperature of over 61° F. is necessary for the successful development of the sexual cycle in the anopheline female, and . . . in October, November, December, January, February, and March the mean minimum temperature never falls to 61° F., and therefore ideal conditions exist for the rapid production of infected mosquitos during these months.

It is well known that malaria parasites generally disappear from the peripheral blood after the onset of blackwater, and this has been regarded by some as evidence that the disease cannot be due to the malaria parasite. Dr. Thomson was so fortunate during his inquiry as to examine 23 cases prior to the onset of blackwater symptoms, and in every case was able to demonstrate the presence of malaria parasites, although these disappeared with or shortly following the commencement of haemoglobinuria. He recognizes a condition named the "pre-blackwater fever type"; in it a small dose of quinine will actually precipitate haemoglobinuria, and it develops in patients suffering from chronic malaria who take quinine irregularly and inefficiently. While quinine will cure malaria and so prevent blackwater it is useless to attempt to cure malaria with a few doses of quinine given once a week

or fortnight, for this only results in chronic malaria, and so in a highly dangerous condition which may fulminate in blackwater fever..

A study of the anopheline mosquitos of Rhodesia implicates *Anopheles costalis* as the chief carrier of malaria. This mosquito abounds all over Southern Rhodesia, is wild in its nature and avoids large towns, but breeds in pools of water in the veld and in the margins of slowly flowing spruits. It is, therefore, a problem of grave complexity and menace for the new Government of Southern Rhodesia. Happily the publication of Dr. Thomson's report among the earliest of the White Papers laid before the Legislative Council is a good augury that those undertaking the new administrative responsibilities are alive to the wisdom of early efforts to ameliorate the health conditions of the newest apanage of the Crown.

